

REMARKS

Claims 1,3-5, and 7-10 are all the claims pending in the application. Claims 3 and 7 are canceled in this Amendment. Solely to advance prosecution of particular embodiments of the present invention, independent claims 1 and 5 have amended to incorporate the features of (now canceled) dependent claims 3 and 7, respectively. Additionally, claim 4 has also been amended to incorporate the features of canceled claim 3. Applicants have added new claims 11 and 12. Claim 11 recites a pipe arrangement block that is operable for use with the fluid mixing apparatus of claim 1. Claim 12 is dependent from claim 11, and recites a particular diameter size for the claimed nozzle. Because the features of these claims would have likely been discovered or reviewed during the initial art search, Applicants believe that a new search would not be necessary in order to examine these new claims.

Claims 1, 4-5 and 8-10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Arpentinier. Claim 3 stands rejected under 35 U.S.C. § 103(a) over Arpentinier in view of Okumura et al. (U.S. Patent No. 4,690,764). The rejection of claim 3 is moot due to the cancellation of the claim, however, since the features of claim 3 have been incorporated into claims 1 and 4, it is addressed below.

According to particular embodiments of the present invention as claimed, a nozzle is inserted within a first flow, with a direction of the nozzle inserted being perpendicular to the flowing direction of the flow. As such, a Karman vortex is generated within the tube at the downstream side of the nozzle, as mentioned in paragraph [0019], pages 11 and 12 of the present specification. The subject gas blown out from the nozzle moves in a manner that the subject gas is caught in the Karman's vortex immediately after being blown out from the tip end, and as

such, a turbulence state is generated. Thus, the reference gas is likely mixed with the subject gas, and the gases are mixed quite quickly in the present invention.

The cited reference, Arpentinier, on the other hand, necessitates a complicated structure, for example, vane (6), taper (9) or the like so as to efficiently mix the gases. Further, the Arpentinier nozzle is not inserted in a perpendicular manner as recited in the claims (see Figure 1), as acknowledged by the Examiner.

In the Okumura et al. apparatus, while there may be some suggestion of parallelism among the “nozzle” and gas paths, based on Figure 1, there is no suggestion that a tip end of one of the nozzles is disposed at a center the other gas path. For example, as shown in Figure 1, “nozzle” 6 extends beyond the opening for introduction of gas inlet 4. Further, the liquid injected through the inner nozzle 6 and the gas supplied through the gas inlet 4 are mixed together within the jet stream generator itself to form a liquid containing minute gas bubbles (see col. 3, lines 35-59). That is, the shape of the jet stream generator and the speed at which the gas is introduced into the fluid provide the mixing process in the Okumura et al. apparatus.

Finally, Arpentinier teaches away from the perpendicular introduction of one fluid/gas into the other stating that the known processes and apparatuses of this type are all involved with axial co-ejection of the second gas into the first (see col. 1, lines 15-17). Indeed, the Arpentinier device is such an axial co-ejection device.

Applicants note that the USPTO is held to a *rigorous* standard when trying to show that an invention would have been obvious in view of the combination of two or more references. *See, In re Sang Su Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002), *citing, e.g., In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (“Our case law makes clear that the best defense against

the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.”). In *Lee*, the Federal Circuit further emphasized that the “need for specificity pervades this authority.” (*Lee* at 1433 (citing *In re Kotzab*, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (“particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed”))). The factual inquiry into whether to combine references “must be based on objective evidence of record.” *Lee* at 1433.

In view of the aforementioned case law, Applicants respectfully submit that the burden of showing particular findings why one of ordinary skill in the art would have selected the combination of Arpentinier and view of Okumura et al. has not been met. Rather, the grounds of rejection provide no findings or even point to a motivation for the combination. The grounds of rejection merely state that it would have been obvious to one of ordinary skill in the art to modify the process and apparatus for mixing two gases of Arpentinier in view of Okumura et al. such that a nozzle disposed perpendicular to one fluid could be provided in order to mix the fluids. Accordingly, Applicants respectfully submit that the rejection is based on improper hindsight.

In view of the above, Applicants submit that reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/086,423

Attorney Docket Q68580

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

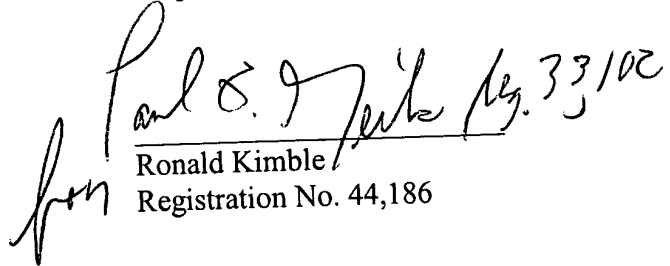
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AMENDMENTS TO THE DRAWINGS

Please find attached Replacement Sheets 1/6 and 2/6 relating to FIGS. 1A-1D, and FIG.

2. Figures 1C, 1D, and 2 have been amended. These amendments were approved in the March 17, 2004 and November 16, 2004 Office Actions.